

JAPAN

EDICT OF GOVERNMENT

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JIS B 9706-2 (2009) (English): Safety of
machinery -- Indication, marking and actuation --
Part 2: Requirements for marking

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*The citizens of a nation must
honor the laws of the land.*

Fukuzawa Yukichi

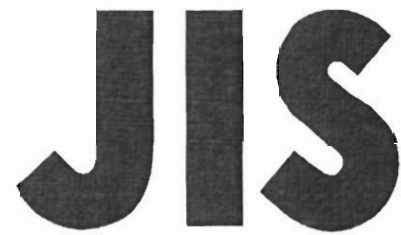
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INDUSTRIAL
STANDARD

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(IEC 61310-2 : 2007)

(JMF)

**Safety of machinery—
Indication, marking and actuation—
Part 2: Requirements for marking**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Health, Labour and Welfare, and the Minister of Economy, Trade and Industry, through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Machinery Federation (JMF) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 9706-2**:2001 is replaced with this Standard.

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JIS B 9706 consists of the following three parts under the general title “*Safety of machinery—Indication, marking and actuation*”

Part 1: Requirements for visual, acoustic and tactile signals

Part 2: Requirements for marking

Part 3: Requirements for the location and operation of actuators

Safety of machinery— Indication, marking and actuation— Part 2: Requirements for marking

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of **IEC 61310-2** published in 2007 without any modifications of the technical contents.

The portions underlined with dots are the matters not given in the corresponding International Standard.

1 Scope

This Standard specifies requirements for the marking of machinery.

It gives general rules on marking for identification of machinery, for safe use related to mechanical and electrical hazards, and for the avoidance of hazards arising from incorrect connections.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows:

IEC 61310-2:2007 *Safety of machinery—Indication, marking and actuation—Part 2: Requirements for marking* (IDT)

The symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For standards with the year indication, only the editions of the indicated year shall apply but the revisions (including amendments) made thereafter shall not apply. The normative reference without the indication of the year shall apply only to the most recent edition (including amendments).

JIS B 9700-1:2004 *Safety of machinery—Basic concepts, general principles for design—Part 1: Basic terminology, methodology*

NOTE : Corresponding International Standard: ISO 12100-1:2003 *Safety of machinery—Basic concepts, general principles for design—Part 1: Basic terminology, methodology* (IDT)

JIS B 9700-2:2004 *Safety of machinery—Basic concepts, general principles for design—Part 2: Technical principles*

NOTE : Corresponding International Standard: ISO 12100-2:2003 *Safety of machinery—Basic concepts, general principles for design—Part 2: Technical principles* (IDT)

JIS B 9706-1:2009 *Safety of machinery—Indication, marking and actuation—Part 1: Requirements for visual, acoustic and tactile signals*

NOTE : Corresponding International Standard: IEC 61310-1:2007 *Safety of machinery—Indication, marking and actuation—Part 1: Requirements for visual, acoustic and tactile signals* (IDT)

JIS B 9960-1:2008 *Safety of machinery—Electrical equipment of machines—Part 1: General requirements*

NOTE : Corresponding International Standard: IEC 60204-1:2005 *Safety of machinery—Electrical equipment of machines—Part 1: General requirements* (MOD)

JIS C 0920:2003 *Degrees of protection provided by enclosures (IP Code)*

NOTE : Corresponding International Standard: IEC 60529:2001 *Degrees of protection provided by enclosures (IP Code)* (IDT)

JIS C 60079-0:2004 *Electrical apparatus for explosive gas atmospheres—Part 0: General requirements*

NOTE : Corresponding International Standard: IEC 60079-0:1998 *Electrical apparatus for explosive gas atmospheres—Part 0: General requirements and Amendment 1:2000* (IDT)

JIS Z 8202-0:2000 *Quantities and units—Part 0: General principles*

NOTE : Corresponding International Standard: ISO 31-0:1992 *Quantities and units—Part 0: General principles* (IDT)

JIS Z 8203:2000 *SI units and recommendations for the use of their multiples and of certain other units*

NOTE : Corresponding International Standard: ISO 1000:1992 *SI units and recommendations for the use of their multiples and of certain other units* (IDT)

IEC 60027-1:1992 *Letter symbols to be used in electrical technology—Part 1: General*

IEC 60027-2:2005 *Letter symbols to be used in electrical technology—Part 2: Telecommunications and electronics*

IEC 60027-3:2002 *Letter symbols to be used in electrical technology—Part 3: Logarithmic and related quantities, and their units*

IEC 60027-4:1985 *Letter symbols to be used in electrical technology—Part 4: Symbols for quantities to be used for rotating electrical machines*

IEC 60417 *Graphical symbols for use on equipment*

ISO 7000:2004 *Graphical symbols for use on equipment—Index and synopsis*

ISO 7010:2003 *Graphical symbols—Safety colours and safety signs—Safety signs used in workplaces and public areas*

3 Terms and definitions

For the purposes of this document, the following terms and definitions, in addition to those of **JIS B 9706-1**, apply.

3.1 rated value

value of a quantity used for specification purposes, established for a specified set of operating conditions of a component, device, equipment, or system

(IEV 151-16-08)¹⁾

Note ¹⁾ “IEV” is the abbreviation of International Electrotechnical Vocabulary.
IEV is specified in **IEC 60050** series.

3.2 rating

set of rated values and operating conditions of a component, device, equipment or machine

(IEV 151-16-11, modified)

3.3 marking

application of labelling on a product or on a package primarily for the purpose of identifying the product, and certain features of the product, for its safe use

4 Marking for identification and for safe use

4.1 General

In accordance with **JIS B 9700-2**, machinery shall bear all markings which are necessary

- for its unambiguous identification;
- for its safe use;

and supplementary information shall be given, as appropriate:

- permanently on the machinery;
- in accompanying documents such as instruction handbooks;
- on the packaging.

4.2 Marking of complete machinery

The following information shall be provided:

- identification of the product including name and address of the supplier, designation of series or type, serial number, if any, and year of construction;
- designation of rated values;
- indication of compliance with mandatory requirements if any.

4.3 Marking for safe use

4.3.1 General

Where essential for safe use, the relevant rated values and characteristics listed in **4.3.2**, **4.3.3** and **4.3.4** shall be given.

4.3.2 Markings related to mechanical hazards

These may include, but not be limited to:

- a) power input/output;
- b) maximum speed of rotating parts;
- c) mass (of removable part, etc.);
- d) maximum diameter of tools to be fitted;
- e) direction of movement;
- f) maximum load;
- g) cooling/heating conditions;
- h) permissible environmental conditions, for example, pressure, shock, vibration, temperature;
- i) mechanical stability;
- j) mode of operation;
- k) guard adjustment data;
- l) necessity of wearing personal protective equipment;
- m) frequency of inspection and maintenance;
- n) rating of lifting equipment.

4.3.3 Markings related to fluid power hazards

In addition to the markings listed in **4.3.2**, these may include, but not be limited to:

- a) design operating pressure;
- b) maximum safe operating pressure;
- c) test pressure;
- d) flow rate;
- e) safe operating temperature.

Valve actuators and their functions shall be plainly and permanently identified with the same identification used on the circuit diagram.

4.3.4 Markings related to electrical hazards

In addition to the markings listed in **4.3.2**, these may include, but not be limited to:

- a) rated voltage, current, frequency;
- b) number of phases;
- c) symbol for classification for protection against electric shock, in accordance with **IEC 60417**;
- d) warning of hazards arising from dangerous voltages, in accordance with **IEC 60417**;
- e) designation of IP code, in accordance with **JIS C 0920**;

- f) warning of presence of residual voltages, in accordance with **JIS B 9960-1**;
- g) symbol indicating the type of protection for use in explosive atmospheres, in accordance with **JIS C 60079-0**.

5 Application of markings

5.1 General

Machinery and parts of machinery, the fitting or refitting of which could be a source of risk, shall be marked by means such as rating plates, name-plates, labels, stamps, engravings and colours. Such marking shall be considered an integral part of the delivery of the machinery. Any marking on the equipment shall be consistent with that in the accompanying documentation to avoid confusion.

Markings, signs and textual information shall be readily understandable and unambiguous, especially in regard to which part or function of the machine they relate.

Signs such as graphical symbols and safety signs shall be used in preference to textual information. Graphical symbols shall conform, where possible, to those standardized in **IEC 60417** and **ISO 7000**. Safety signs shall conform to **ISO 7010** (see Annex A).

Textual information shall be in the language(s) of the country in which the machine is to be used and may be, at the user's request, in the language(s) understood by the operators and exposed persons.

Where a machine or piece of equipment, excluding consumable items, has insufficient space on it for lettering to be big enough to be legible or to be marked at all, the minimum information specified shall be provided on the packaging in which the item is distributed.

The markings shall be clearly visible when the machine is installed in the manner prescribed by the manufacturer, or, when this is not possible, additional markings or written warnings shall be placed near the machine in such a manner that they are visible to exposed persons.

Marking shall be permanent and remain legible throughout all phases of the "life" of the machine (see also clause 7).

All equipment shall be packaged in a manner that preserves its identification during transportation.

NOTE 1 JIS C 0452-1 establishes general principles for the structuring of information on installations. Based on these principles, guidance is given for the formulation and application of unambiguous discrete object reference designations for objects in any system.

The designation correlates information about an object among different kinds of documents and the products implementing the intention of the installation. For maintenance purposes, the object reference designation or part of it may be shown on or near the object in the installation.

NOTE 2 JIS S 0137 gives information on the instructions for use of products for consumer interest.

5.2 Representation of rated values

The International System of Units (SI) as set out in **JIS Z 8202-0** shall be used. For further guidance on application, see **IEC 60027-1**, **IEC 60027-2**, **IEC 60027-3**, **IEC 60027-4** and **JIS Z 8203**.

Machinery shall be marked with rated values for those characteristics which are relevant for its safe use, such as:

- input or output power in watts;
- operating pressure in pascals²⁾;
- supply voltage in volts;
- maximum speed in revolutions per minute or metres per minute.

Each rating value marking shall consist of the numerical value of the characteristic followed by the unit symbol.

Machinery suitable for use at two or more discrete rated values shall be marked with

- values in a descending order separated by a solidus;
- symbol for the unit.

Examples: 3 000/1 500/750 r/min

3 000/1 500/750 min⁻¹

10/5/2 MPa (gauge pressure)²⁾

Machinery suitable for use within a range of rated values shall be marked with

- the limit values in ascending order separated by three dots;
- symbol for the unit.

Examples: (1 000 to 1 500) r/min

(1 000 to 1 500) min⁻¹

(-20 to +20) °C

(100 to 400) Hz

(200 to 500) Pa

Note ²⁾ There are two types of pressure—"absolute pressure" and "gauge pressure".

6 Marking of connections

6.1 General

All connectors shall be marked as necessary to facilitate correct connection.

Where possible, the types and arrangements of connectors which can be readily separated and remade, and for which misconnection could give rise to a hazard, shall either be selected or arranged to ensure correct connection. Where this is not possible, distinctive marking shall be used. Colour coding shall be used only as supplementary means.

6.2 Mechanical connections

Where it is not otherwise possible to prevent incorrect mechanical connection of parts, parts shall be marked to show the correct manner of connection.

When it is necessary to identify lifting eye sockets and alignment marks to be used in the erection and dismantling of machines, the meanings of the marks shall be given in accompanying documents.

6.3 Connections for fluid systems

Connection openings, power take-off points (test connections, bleed points) and drain outlets (for example, reservoir outlets) shall be clearly and distinctly marked. The markings shall correspond to the data on the circuit diagram. If colour coding is used, the meaning of the colour shall be given in the accompanying documentation.

6.4 Electrical connections

The marking of electrical connections shall be as follows:

- bare and insulated conductors, in accordance with **13.2.2** and **13.2.3** of **JIS B 9960-1**;
- terminals, in accordance with **5.1** and **5.2** of **JIS B 9960-1**;
- plug-and-socket combinations, in accordance with **13.4.5** of **JIS B 9960-1**.

7 Durability of markings and their attachment

Throughout the life of the machine, the marking shall remain

- a) securely attached;
- b) legible;
- c) colour fast;
- d) resistant to all intended and expected environment conditions without deterioration caused by environmental factors, for example, liquids, gases, weather, salt mist, temperature, light;
- e) resistant to abrasion;
- f) dimensionally stable.

Methods of test for these requirements shall be in accordance with the relevant product family and/or dedicated product standards (machinery safety standards of Type C described in **JIS B 9700-1**).

Annex A (informative)








Graphical symbols and safety signs







Introduction

This Annex is to show example of graphical symbols and safety signs often-used in machinery and not to constitute the provisions of this Standard.

A.1 Example of graphical symbols and safety signs for marking

An example of graphical symbols and safety signs used for marking on machinery and electrical equipment are shown in the following table.

Reference and symbol	Title	Function
IEC 60417-5005 (2002-10) 	Plus; positive polarity	To identify the positive terminal(s) of equipment which is used with, or generates direct current. NOTE: The meaning of this graphical symbol depends upon its orientation.
IEC 60417-5006 (2002-10) 	Minus; negative polarity	To identify the negative terminal(s) of equipment which is used with, or generates direct current. NOTE: The meaning of this graphical symbol depends upon its orientation.
IEC 60417-5031 (2002-10) 	Direct current	To indicate on the rating plate that the equipment is suitable for direct current only; to identify relevant terminals.
IEC 60417-5032 (2002-10) 	Alternating current	To indicate on the rating plate that the equipment is suitable for alternating current only; to identify relevant terminals.
IEC 60417-5033 (2002-10) 	Both direct and alternating current	To indicate on the rating plate that the equipment is suitable for both direct and alternating current (universal); to identify relevant terminals.
IEC 60417-5018 	Functional earthing; Functional grounding (in US)	To identify a functional earthing terminal in particular a noises clean earthing.
IEC 60417-5019 (2006-08) 	Protective earth (ground)	To identify any terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal of a protective earth (ground) electrode.

Reference and symbol	Title	Function
IEC 60417-5172 (2003-02) 	Class II equipment	To identify equipment meeting the safety requirements specified for Class II equipment according to JIS C 0365 . NOTE: The position of the double-square symbol shall be such that it is obvious that the symbol is part of the technical information and can in no way be confused with the manufacturer's name or other identifications.
IEC 60417-5180 (2003-02) 	Class III equipment	To identify equipment meeting the safety requirements specified for Class III according to JIS C 0365 .
IEC 60417-5036 (2002-10) 	Dangerous voltage	To indicate hazards arising from dangerous voltage.
ISO 7010-W012 	Warning; Electricity	To warn of a hazard from electricity.
ISO 7010-W001 	General warning sign	To signify a general warning.
ISO 7010-W017 	Warning; Hot surface	To warn of a hazard from a hot surface.

Bibliography

JIS C 0365:1997 *Protection against electric shock—Common aspects for installation and equipment*

NOTE : Corresponding International Standard: IEC/CDV 61140:1996 *Protection against electric shock—Common aspects for installation and equipment* (IDT)

JIS C 0452-1:2004 *Industrial system, installations and equipment and industrial products—Structuring principles and reference designations—Part 1: Basic rules*

NOTE : Corresponding International Standard: IEC 61346-1:1996 *Industrial systems, installations and equipment and industrial products—Structuring principles and reference designations—Part 1: Basic rules* (IDT)

JIS S 0137:2000 *Guidelines for instructions for use of products of consumer interest*

NOTE : Corresponding International Standard: ISO/IEC Guide 37:1995 *Instructions for use of products of consumer interest* (IDT)

JIS Z 9101:2005 *Safety colours and safety signs—Design principles for safety signs in workplaces and public areas*

NOTE : Corresponding International Standard: ISO 3864-1:2002 *Graphical symbols—Safety colours and safety signs—Part 1: Design principles for safety signs in workplaces and public areas* (IDT)

IEC 60050-151:2001 *International Electrotechnical Vocabulary (IEV)—Part 151: Electrical and magnetic devices*

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